

Manual

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Lithium Ion Battery

With integrated Battery Management System

LEAB
mobile energy

Important Notes about this documentation

The technical data, information and illustrations contained in this document confirm the status of production at the time of creation.

The manufacturer reserves the right to improve or to change the specifications and documentation of this document at any time without notice.

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Attention! Safety note, disregarding can result in personal injury or material damage or impair the function of the device.



Attention! Risk of electric shock. Safety note, disregarding can result in injury and death and damage or destroy the device.



Note, Supplementary information on operating the unit

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Important note about the usage

This manual is only valid for the device Clayton lithium power pack 12 V / 100 Ah (order number 012-00002GF) and Clayton lithium power pack 24 V / 100 Ah (order number 012-00004GF) in the version for the German market.

To avoid operating errors, you should read this manual before installation and first use and follow the instructions strictly. Please keep this manual for future use close to the device. Other versions can be downloaded from our website www.leab.eu.





Safety Instructions

Lithium batteries are classified as Class 9 hazardous material UN3481, a power source with high energy density and dangerous materials in a closed metal case!

Installation must strictly follow the national safety regulations in compliance with the enclosure, installation, creep age, clearance, casualty, markings, and segregation requirements of the end-use application.

Installation must be performed by qualified installers only. Switch off the system and check for hazardous voltages before altering any connection!

Lithium batteries must be handled only by qualified and trained personnel.

The lowest protection degree of specific parts of a lithium battery is IP20. Ensure that the installation of the Lithium Ion Battery is in accordance with IP20 requirements.

Especially keep these rules:

- Do not open the Lithium Ion Battery.
- Do not discharge a new Lithium Ion Battery before it has been fully charged first.
- Charge only within the specified limits.
- Do not mount the Lithium Ion Battery upside down or on the sides for air-flow.
- Check if the Lithium Ion Battery has been damaged during transport.
- Do not connect lithium systems in serial.

Dangers involved in case of fire:

- Danger of dust particle explosions
- Decomposition through fire or heat under development of toxic and cauterizing gases
- Combustion gasses which strongly irritate eyes and respiratory organs

General actions to be taken by the driver if these dangers occur:

- Turn off the engine
- Put a warning signal on the road to warn others
- Inform others about the danger and direct them to stand away from the wind direction
- Call police and fire fighters immediately and notify them that lithium batteries (UN3481) are onboard

Instruction for fire extinguishing:

- Extinguish with water, if possible cover battery completely in water
- Extinguishing with water will produce fluoride, phosphate, fluoride-oxide and carbon-oxide.
- Alternatively extinguish with a CO² extinguisher.

Note: when put to storage the battery must be fully charged and must be charged again every 6 months.



ON-SPILLABLE
LI-ION BATTERY

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Handling and Maintenance

ATTENTION: Never connect Lithium Batteries in serial.

Quick start:

Connect INPUT3 to GND or the black minus terminal.

The battery starts up and LED's lights up for fuel gauge and status becomes active.

Start-up of an empty battery:

Restart the battery and begin charging in less than 30 seconds.

If the battery is deeply discharged; restart and begin charging in less than 3 seconds.

Periods between recharge in storage (off) and idle mode:

The time for a fully charged battery is:

12V Lithium Ion Battery

Storage: 6 months

Idle: 9 days

24V Lithium Ion Battery

Storage: 6 months

Idle: 15 days

Overheating of the battery:

The red LED will flash two times; wait until the battery has cooled down.

Other failures: See page 17

EMC and standards:

2006/95/EC (Safety directive);

The following harmonized standards have been applied:

EN 60950-1:2001+ A11:2004 (LVD)

2004/108/EC (EMC directive);

The following harmonized standards have been applied:

EN 61000-6-3: 2007 Emission hold equipment

EN 61000-6-2: 2007 Immunity industrial

Before Installation

ATTENTION: Read the safety instructions before starting to install the battery and install the needed functions as shown in the diagrams.

ATTENTION: When installing the battery, do not mount the Lithium Ion Battery upside down or on the sides for air-flow. Do not cover or block the fan or the air inlet to insure the battery does not overheat.

Mounting holes are for prefixation, suitable fixation has to be added.

ATTENTION: Do not connect the batteries in series, only in parallel.

ATTENTION: Make sure the Lithium Ion Battery is powered down before starting the installation and do not connect any active wakeups before end of the installation.

ATTENTION: If DC consumers are part of the installation, please make sure to apply the DC consumers with a switch or fuse so they can be disconnected. The DC consumers may in some cases cause problems when starting up the system.

In the box:

1x Lithium Ion Battery

1x Phoenix connector 3 pol

1x Phoenix connector 5 pol

1x CAN communication cable

1x Short form manual

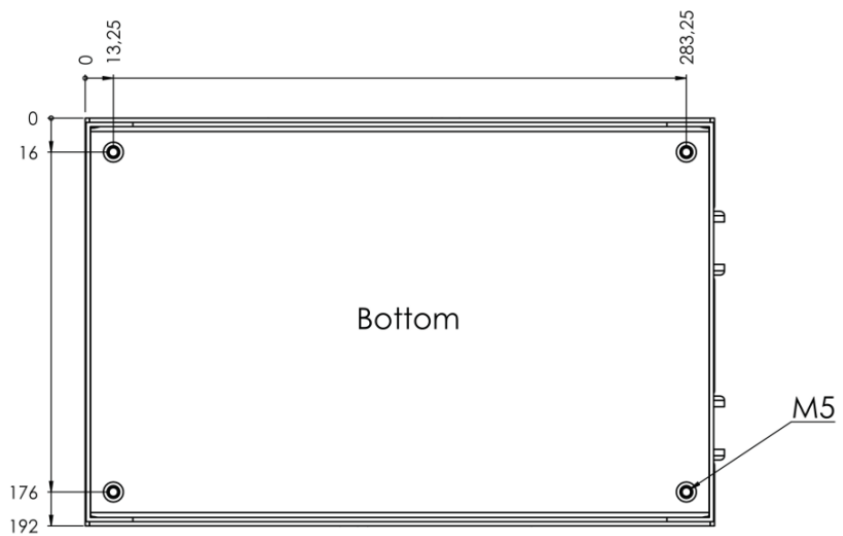
Mounting



ATTENTION: Mount the battery topside up or on the side, never upside down.

ATTENTION: Fans inside, be sure of air flow without interruption

Mounting holes for fixation: M5
See more dimensions on page 15



Installation Guide



ATTENTION: Before installing, make sure that all appliances are turned off.

General Installation Instructions

- A general system utilizing a CP Lithium Ion battery, a CP G3 Inverter/Charger and a CP G3 Display all have the following in common.
- It is highly recommended to add fuses to the 230 VAC output to protect the equipment.
- The communications cable and power cables to the display unit must be 0.5 mm².
- The supplied 200 A fuse must be mounted on either the positive or negative terminal as illustrated here.

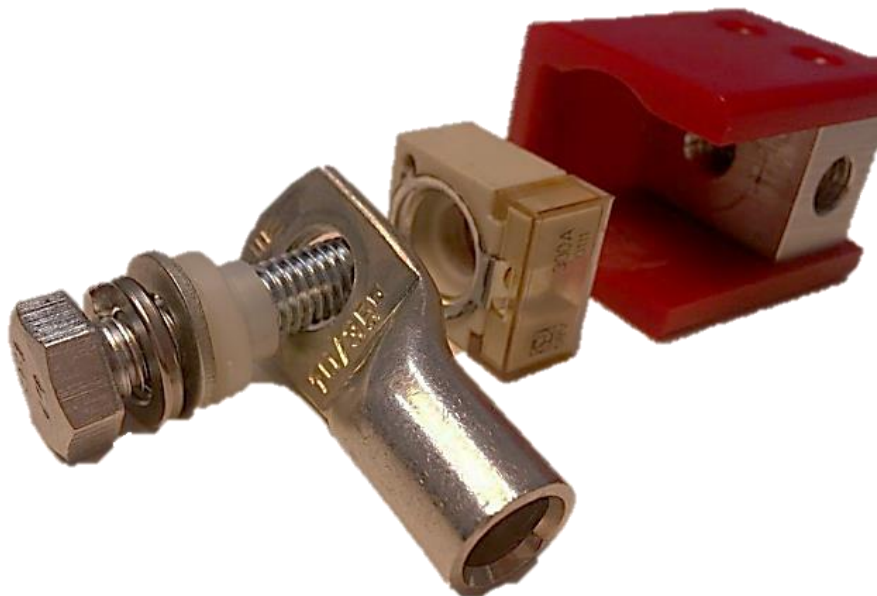


Figure 1 DC-Fuse

	Schraube	Drehmoment
Front	M8x30 mm	8 Nm
Top	M8x30 mm	12 Nm
Mounting	M5 ¹	5 Nm

¹ The length of the M5 mounting screws depends on what the Li-Ion battery is mounted on.

Standalone Setup

The diagram on Figure 2 shows how to wire a standalone system. This can be used as an Uninterruptable Power Supply (UPS) system.

ATTENTION: Make sure the AC mains is disconnected during assembly or service

Connecting the G3 Inverter/Charger to the Li-Ion Battery

1. Connect the GND connections to all the components.
2. Connect all the data and small signal connections.
3. Connect the 230VAC mains connections.

NB: the 230VAC mains relay (not supplied) is essential for the system if it needs to charge by the mains supply.

4. Connect the positive DC supply.

To build up a connection with SingleWire (SW-Data), it is necessary to connect the SW-GND contact with GND.

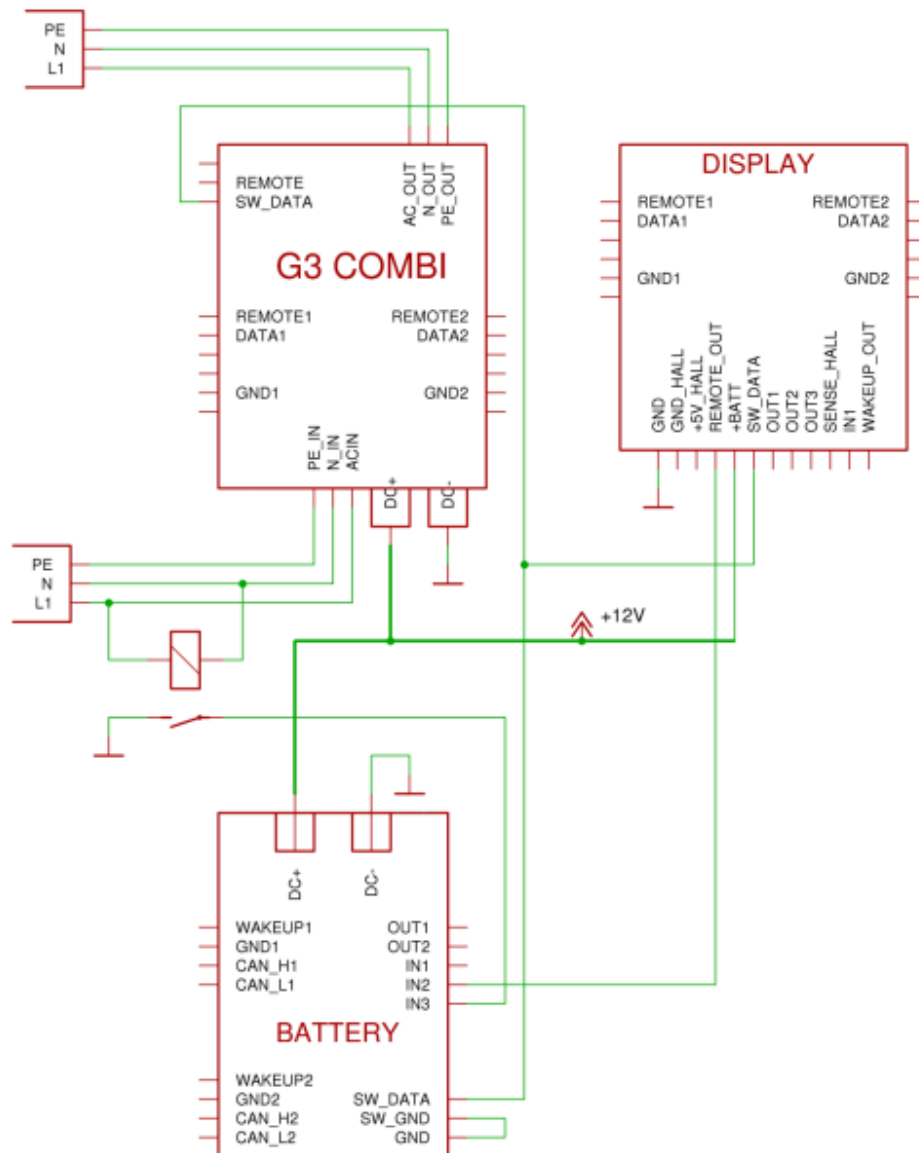


Figure 2 Standalone

Alternator Setup with Battery Separator

Starting with the standalone system, the display power (red wire) should be moved from the Li-Ion battery to the lead-acid battery as in Figure 3.

- Using connection point, connect the positive terminal of the Li-Ion battery, the G3 Inverter/Charger and the G3 Display to the DC OUTPUT on the CDR Battery separator.
- Connect the OUTPUT 2 to the GND terminal of the CDR battery separator.
- Connect the Lead-Acid battery GND to the negative terminal of the Li-Ion battery, the G3 Inverter/Charger and the G3 Display using a connection point.
- Connect the INPUT 1 to the D+ signal from the car.
- Connect the positive power from the lead acid battery in the car to the DC INPUT terminal on the CDR battery separator.

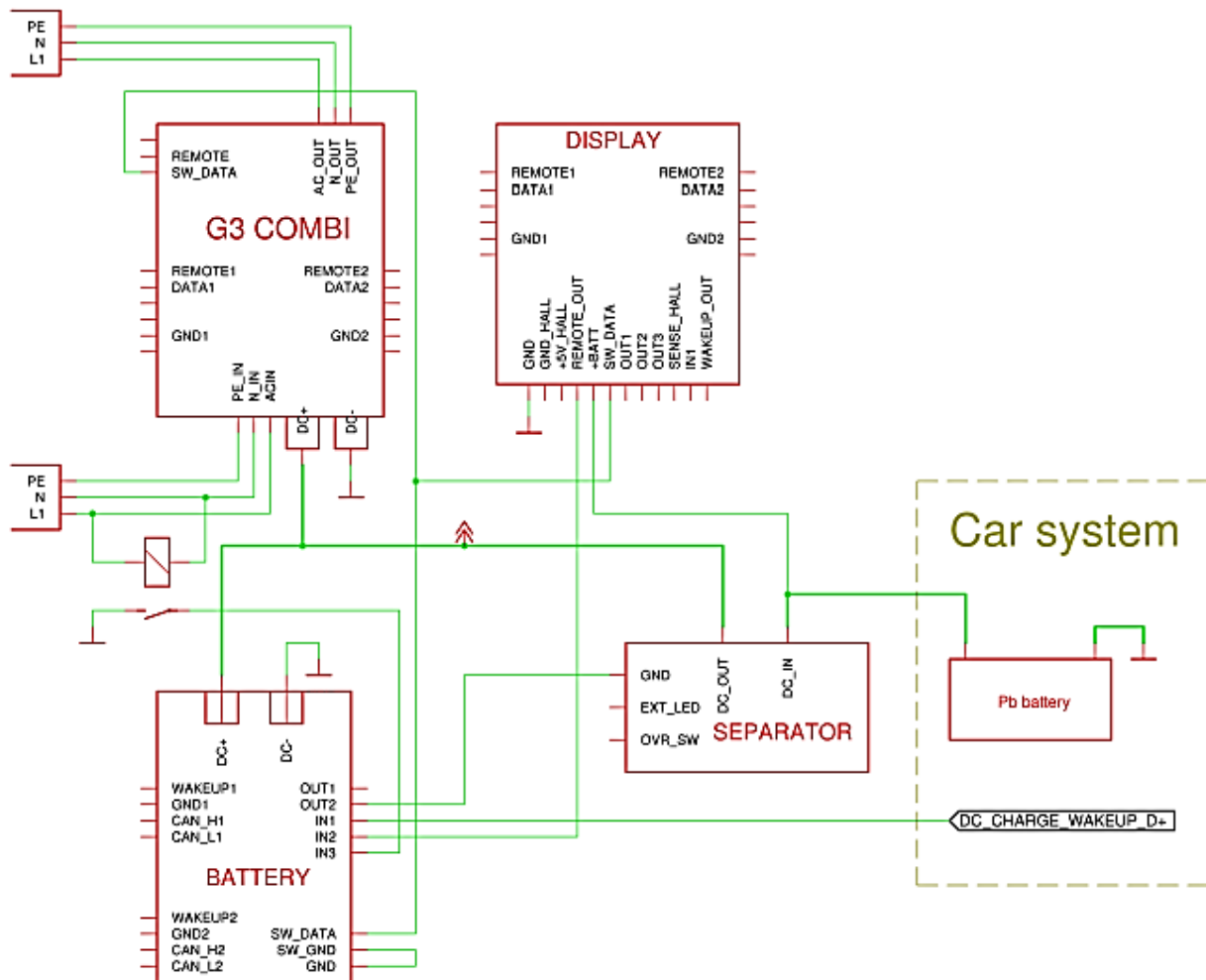


Figure 3 Alternator Setup with Battery Separator

Alternator Setup with 12V/24V DC-DC Converter

Using a 12V/24V DC-DC Converter insures that the voltage for charging the Li-Ion battery is sufficient.

Figure 4 shows the diagram of how to connect this setup.

- Using a connection point, connect the positive terminal of the Li-Ion battery and the G3 Inverter/Charger to the 24V OUT on the Booster.
- Connect the G3 Display power to the Lead-Acid battery positive terminal.
- Connect the control coil of a 24Vdc relay from OUTPUT 2 on the Li-Ion battery to the positive terminal on the Li-Ion battery.
- Connect the contact of the 24Vdc relay between the positive terminal of the Li-Ion battery and the IGN terminal of the booster.
- Connect the INPUT 1 to the D+ signal from the car.
- Using a connection point, connect the negative terminal of the Li-Ion battery, the G3 Inverter/Charger, the G3 Display and Lead-Acid battery to the GND on the Booster.

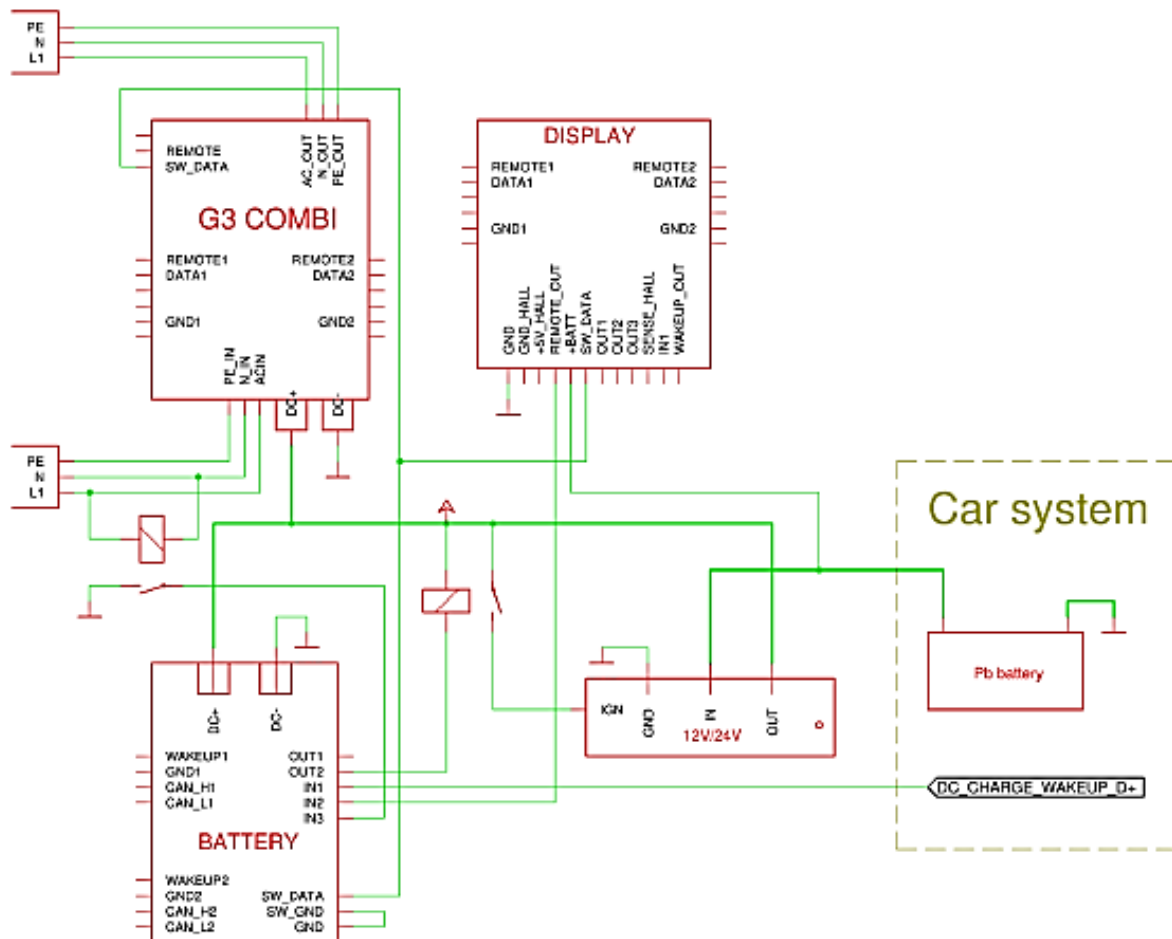


Figure 4 Alternator Setup with 12V/24V DC-DC Converter

Auxiliary Alternator

It is possible to charge from an extra alternator if it has a control function/input. This setup is shown in the diagram in Figure 5.

- Using a connection point, connect the negative terminal of the Li-Ion battery, the G3 Inverter/Charger and the G3 Display to the GND terminal on the alternator.
- Connect OUTPUT 2 of the battery to whatever control function/input the alternator has.
- Using a connection point, connect the positive terminal of the Li-Ion battery, the G3 Inverter/Charger and the G3 Display to the positive terminal on the alternator.
- If possible, connect the G3 Display power to an alternate power source, including a GND connection to the rest of the system.

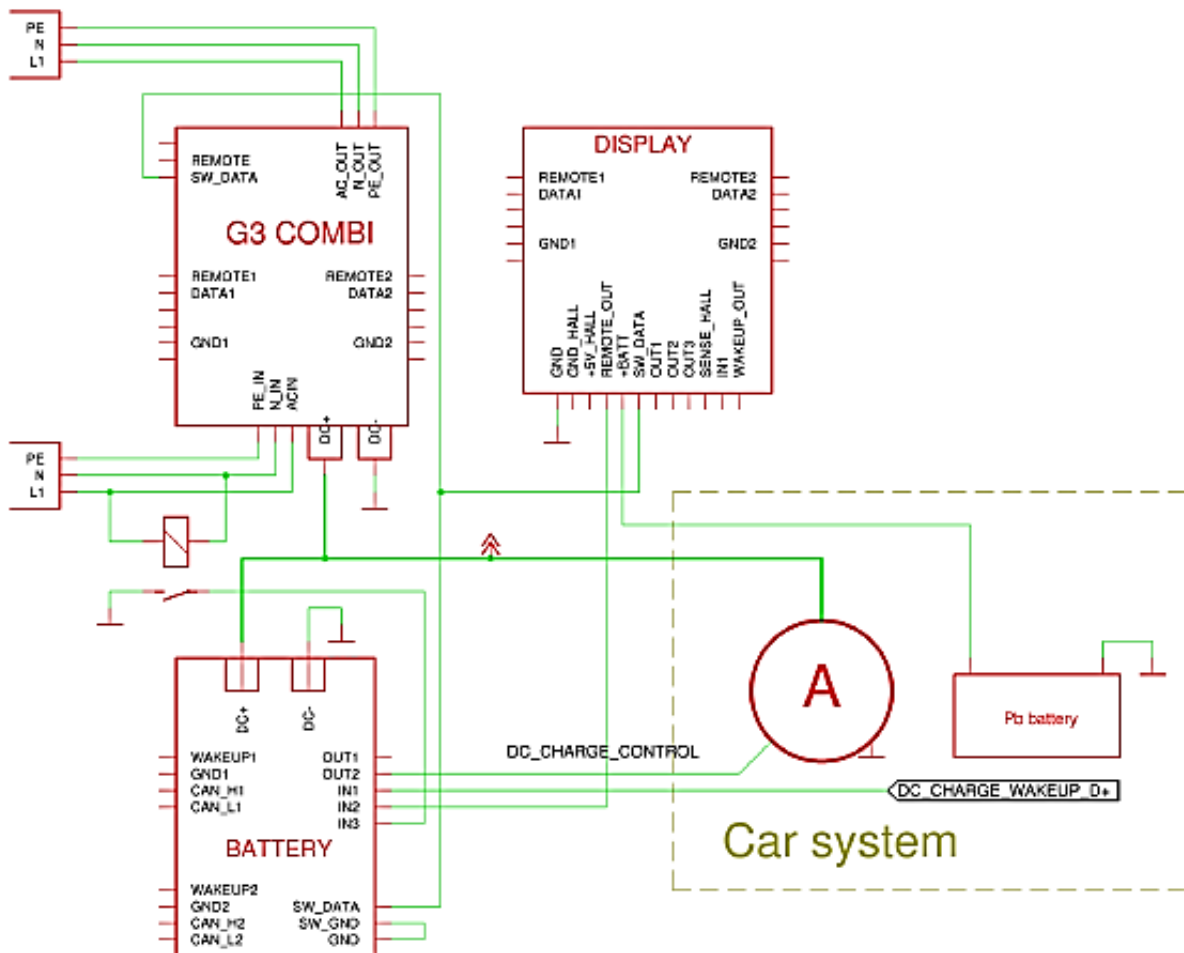


Figure 5 Auxiliary Alternator

Using an Alternate AC/DC or DC/DC charger



ATTENTION: Before installing, make sure all appliances are turned off.



ATTENTION: The CP Li-Ion battery must be able to stop the charging via a charge control relay.

- Connect the DC Charging device to the battery through a DC charge control relay as shown in the diagram Figure 6.
- The charge control relay must get its control signal from OUTPUT 2 on the battery.
- A charge wakeup relay is connected between the power input pins of the charger to sense when the CP Li-Ion battery can start charging. This relay is connected between the INPUT 3 on the Li-Ion battery and GND. The relay must be of a Normally Open type, in order to pull the input to GND when active.

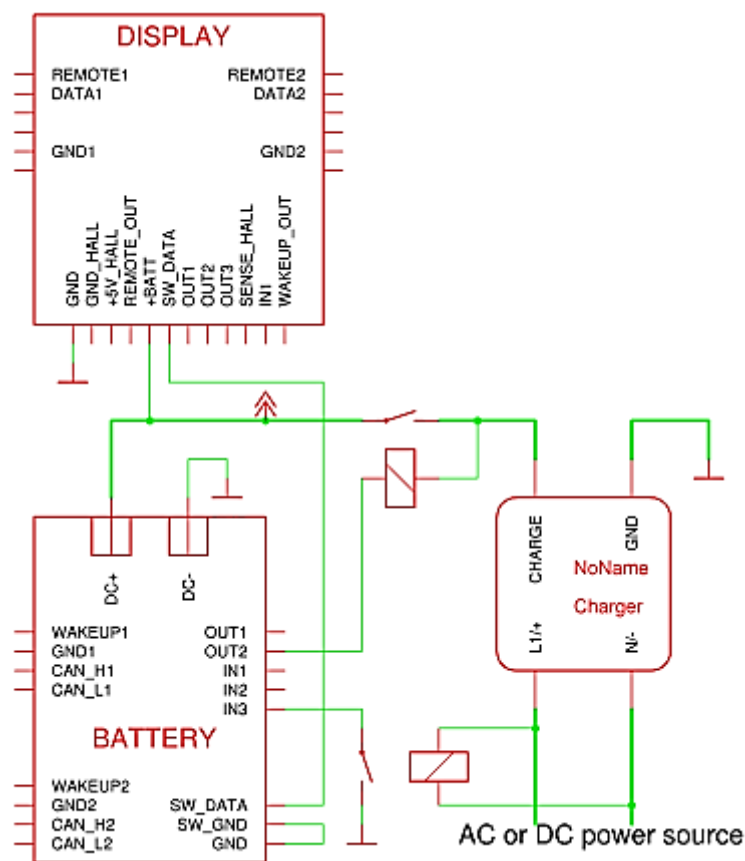


Figure 6 Using an Alternate AC/DC or DC/DC charger

Parallel Connection of Clayton Power Li-Ion Batteries



ATTENTION: Before installing, make sure that all appliances are turned off.



ATTENTION: Connect a maximum of 20 Clayton Power Li-Ion batteries in parallel.

ATTENTION: Do not mix Clayton Power Li-Ion batteries with batteries of different brands of batteries unless proper separation is used.

ATTENTION: Do not connect Clayton Power Li-Ion batteries in serial.

Cables

To ensure optimal performance all batteries in parallel must be connected to one pair of connection points. All cables from the batteries to these connection points must have the same length ($\pm 20\%$). All the cables must meet the following criteria

35 mm ²	< 2m
50 mm ²	< 3m
70 mm ²	< 5m

Parallel Connection Switch

Two DIP switches are placed in a cutout in the front of the battery. These are illustrated in Figure 6.

To connect batteries in parallel, each battery must be connected via the CAN bus with the supplied 4p4 cables. The two batteries with only one cable must have switch 1 in the on position and switch 2 in the off position. The rest of the batteries must have both switches in the off position.

A maximum of 20 CP Li-Ion batteries can be connected in parallel.

The SW communication must only be connected to one of the batteries. This should preferably be one of the end batteries as in Figure 7 and Figure 8.

Serial Connection of Clayton Power Li-Ion Batteries

Do not connect the CP Li-Ion batteries in serial. If it is necessary please contact LEAB Automotive.

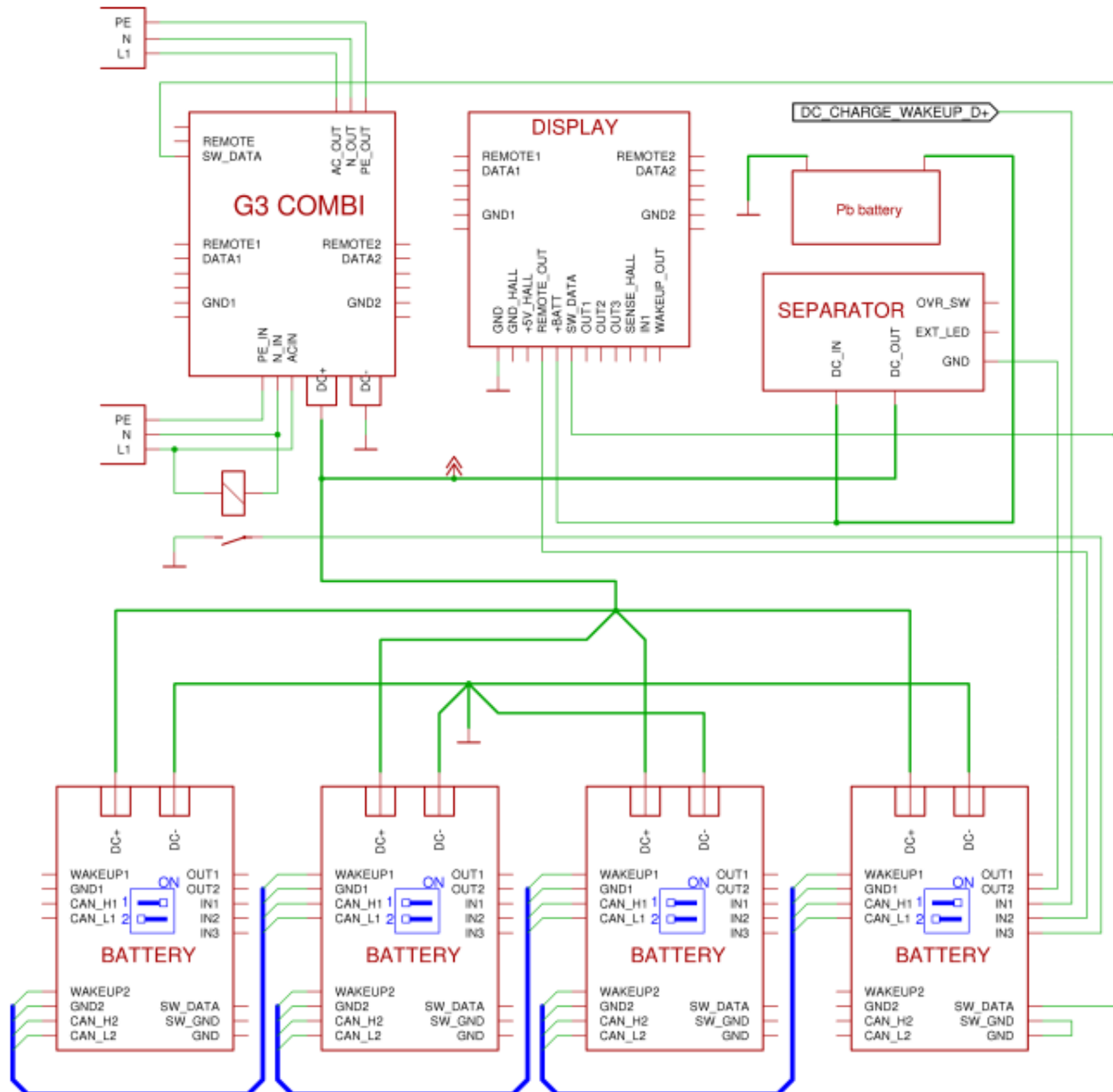


Figure 7 Parallel Connection

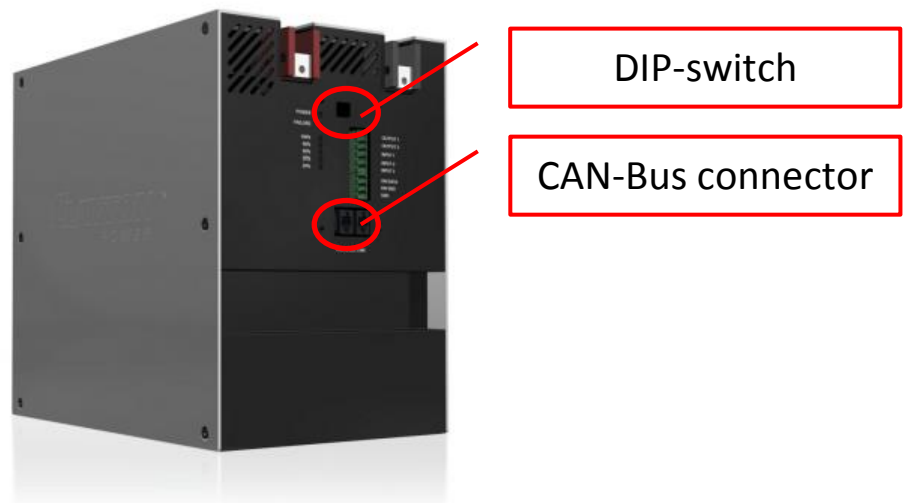
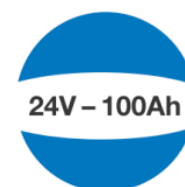
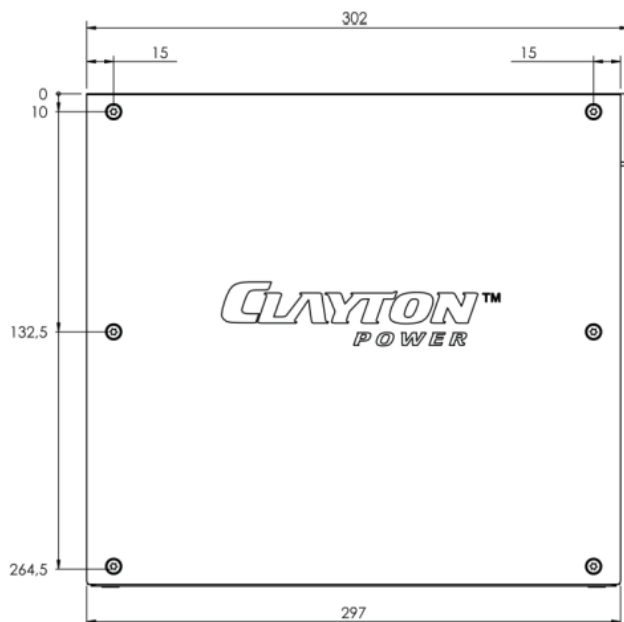
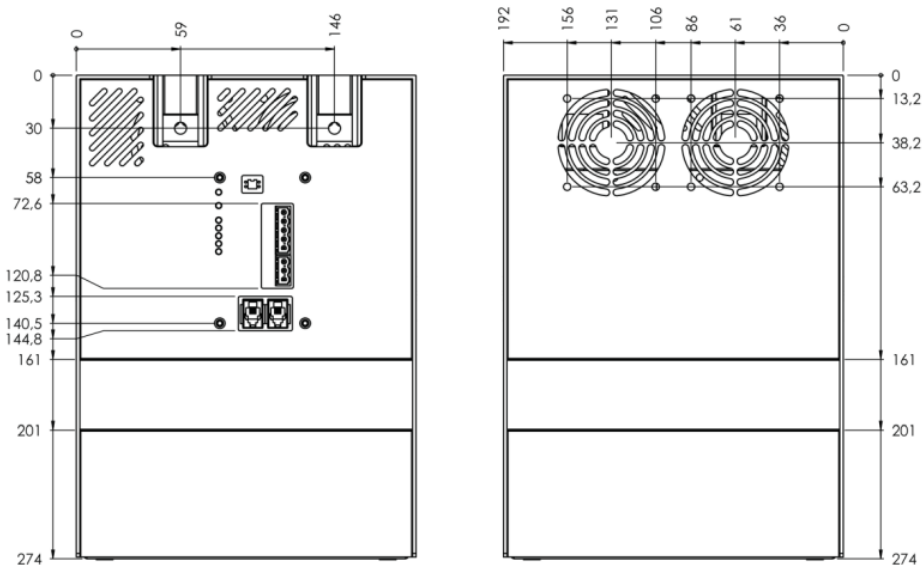


Figure 8 Parallel Connection Switch

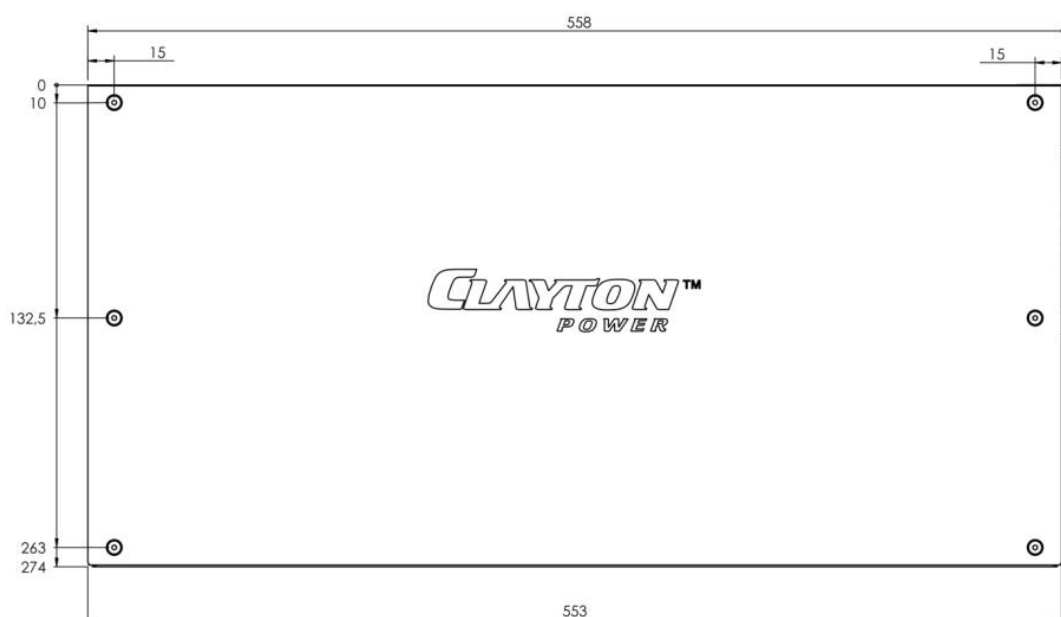
A Physical dimensions

Front and back of both
24V and 12V
Li-Ion battery



Left: Side of 12V Li-Ion battery

Bellow: Side of 24V battery



Lithium battery general parameters

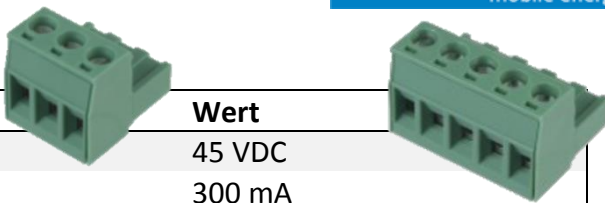
Battery type		100 Ah-12V	100 Ah-24V
Available capacity		80 Ah	80 Ah
Nominal battery voltage		12 VDC	24 VDC
Operation voltage discharge		9,2 VDC	18,4 VDC
Operation voltage charge		15 VDC	30 VDC
Cell voltage min cut-off		2,3 VDC	
Cell voltage max cut-off		4,2 VDC	
Continuous discharge current		100 A	
	10 min.	200A (temperature controlled)	
Max discharge Impulse current	5 sec.	>500A	
	10 µsec.	>1000 A	
Continuous charge current		100 A	
Standart charge/discharge current		50 A	
Lifecycle 80% DOD		>3000	
Lifecycle 70% DOD		>5000	
Operating temperatur		-40°C ↔ 50°C	
Cooling		Forced fan	
Inputs		3	
Outputs		2	
Communications		CAN (SAEJ1939) –CP Single Wire	
Parallel connection		1 to 20	
Self-discharge rate per month (sleep mode)		<3%	
Operation mode consumption		350 mA	180 mA
Sleep mode consumption (sleep mode)		<2 mA	
Connection terminals		M8 screw	
Weight		19 kg	36 kg
Dimensions in mm (HxWxL)		274x192x301	274x192x558

Parallel connector parameters

Pin #	Signalname	Parameter	Wert
1	CAN Wakeup	Output voltage (open drain)	Battery voltage*2
		Output Impedance	10 kΩ
		Max Input Voltage	60 VDC
		Input Trigger Voltage (High/Low)	3,5 VDC
		Input Impedance (as pull down)	4,7 MΩ
2	CAN GND	Max Current	250 mA
		Fuse rating	300 mA (thermisch)
3	CAN High	Communication Speed	125 kbps
		Communication Protocol	>MΩ
		Output Impedance	SAE J1939-11
4	CAN Low	Communication Speed	125 kbps
		Communication Protocol	>MΩ
		Output Impedance	SAE J1939-11



Signal connector parameters



Pin Name	Parameter	Wert
Output 1 Output 2	Max drain voltage	45 VDC
	Max sink current	300 mA
	Fuse Rating	300 mA (thermal)
	Topology	Open collector
Input 1 Input 2	Max input Voltage	45 VDC
	Input voltage level (high/low)	TTL-Level
	Input Impedance (as pull up)	4,7 MΩ
Input 3	Max input Voltage	45 VDC
	Input voltage level (high/low)	3.8 VDC
	Input Impedance (as pullup, +5V)	2 MΩ
SW DATA (Single wire bus)	Communication speed	9600 Baud
	Output Impedance (+12V)	1 kΩ
	Fuse rating	300 mA (thermal)
SW GND (Single wire bus)	Max current	300 mA
	Fuse rating	300 mA (thermal)
GND	Max current	300 mA
	Fuse rating	300 mA (thermal)

LED-Codes

Power LED (Blue)

Solid light	Connected
Flashing (3Hz)	Connected and charging

Fuel gauge LED's

LED	SOC Level	Status
100 % (green)	>90%	Solid light
	80% - 90%	Flashing (1Hz)
80 % (green)	>70%	Solid light
	60%-70%	Flashing (1Hz)
60 % (green)	>50%	Solid light
	40%-50%	Flashing (1Hz)
40 % (green)	>30%	Solid light
	20%-30%	Flashing (1Hz)
20% (red)	>10%	Solid light
	0%-10%	Flashing (1Hz)

LED Codes: Failure LED (Red)

Code	Failure	Failure description
1 x Flash	Battery is empty	Battery is empty, restart the battery and ensure charge current ($> 1\text{ A}$) within 30 sec or the battery will enter sleep mode
2 x Flash	Battery temperature too high	Battery temperature is too high, wait until the battery has cooled down.
3 x Flash	Battery overloaded or short circuit	Battery overloaded, remove the load and restart the battery. The battery will enter sleep mode after 30 sec.
4 x Flash	Pre-charge failure	Battery unable to pre-charge the load. Remove load and restart the battery. The battery will enter sleep mode after 30 sec.
5 x Flash	Battery overcharged	Charger is overcharging the battery, check charger. Battery is protecting and doing maintenance balancing.
6 x Flash	Internal failure: Cell voltage monitor	Battery cell voltage monitor is failing. The battery will enter sleep mode after 30 sec. Contact your supplier
7 x Flash	Internal failure: Cell temperature monitor	Battery cell temperature monitor is failing. The battery will enter sleep mode after 30 sec. Contact your supplier
8 x Flash	Internal failure: internal communication failure	Battery internal communication is failing. The battery will enter sleep mode after 30 sec. Contact your supplier
9 x Flash	Internal failure: Other failures	Battery has other failures. The battery will enter sleep mode after 30 sec. Contact your supplier


Figure 9 LED Display

Material Safety Data Sheet

MSDS No.: TS-20110201 Creation Date: 01 Feb. 2011



MATERIAL SAFETY DATA SHEET

PRODUCT NAME: LITHIUM-ION BATTERY

1 - IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY /UNDERTAKING

Identification of the substance/preparation

Product name: Lithium-Ion Battery

Use of the substance/Preparation: Battery

Company/Undertaking identification

Supplier:

Name : Winston Battery Ltd.

Address : No.3 Industrial Zone,Lisonglang Village,

Gongming Town, Bao'an Dist, Shenzhen, P.R.C

Phone: + 86 755 86026789 Fax: +86 755 86026678

Emergency contact:

CHEMTREC Phone: 1-800-424-9300

2 – COMPOSITION/INFORMATION ON INGREDIENTS

BATTERY MODEL: WB-LYP/WB-LP			
Ingredient	Weight %	CAS No.	Notes
Rare earth Y	40.5%	7440-65-5	----
Li ₂ CO ₃	16%	554-13-2	----
Mn	4.4%	7439-96-5	----
Ca	0.3%	7440-70-2	----
Graphite	5%	7782-42-5	----
Na	1.5%	7440-23-5	----
C	3.1%	7440-44-0	----
Fe	3.4%	7439-89-6	----
PE	3.3%	9002-88-4	----
Cu	10%	7440-50-8	----
Al	6%	7429-90-5	----
K	1.7%	7440-09-7	----
F	3.3%	7782-41-4	----
Sr	1.5%	7440-24-6	----

3 – HAZARDS IDENTIFICATION :

3.1 Physical :

The Lithium-Ion rechargeable batteries described in this Material Safety Data Sheet are sealed units which



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are not hazardous when used according to the recommendations of the manufacturer.

Under normal conditions of use, the solid electrode materials and liquid electrolyte they contain are non- reactive provided the battery integrity is maintained and seals remain intact. There is Risk of fire only in cases of abuse (mechanical, thermal, electrical), which leads to the activation of the safety valve and/or the rupture of the battery container. Electrolyte leakage, electrode materials reaction with moisture/water or battery vent/fire may follow, depending upon the circumstances.

In case of excessive internal pressure and/or temperature Winston batteries are fitted with a safety vent for protection and/or rupture of the cell case.

3.2 Chemical

Classification of dangerous substances contained into the product as per directive 67/548/EEC

Substance		Melting point	Boiling point	Classification			
CAS NO	Chemical Symbol			Exposure limit	Indication of danger	Special risk (1)	Safety advices (2)
12190-79-3	LiFeYPO4	> 1000 ° C	N/A				
EC: 96-49-1 DMC: 616-38-6 DEC: 105-58-8 EA: 141-78-6	Organic solvents (DC-DMC DEC-EA)	EC: 38 ° C DMC: 4 ° C DEC:-43 ° C EA: -84 ° C	EC: 243 ° C DMC: 90 ° C DEC: 127 ° C EA: 77 ° C	None established OSHA	Flammable		
21324-40-3	LiPF 6	N/A (decomposes at 160 ° C)	N/A	None established OSHA	R 22 R43	S2 S22 S24 S26 S36 S37 S43 S45	
					R21 R22 R41 R42/43	S2 S24 S26 S36 S37 S45	
					R14 R21 R22 R41 R43	S2 S8 S22 S24 S26 S36 S37 S45	

3.2.1 – Nature of Special risks:

R14 Reacts with water.

R 21 Harmful in contact with skin.

R22 Harmful if swallowed.

R41 Risk of serious damage to the eye.

R42/43 May cause sensitization by inhalation and skin contact.

R43 May cause sensitization by skin contact.

3.2.2 – Safety advices:

S 2 Keep out of reach from children.

S 8 Keep away from moisture.

S 22 Do not breathe dust.

S 24 Avoid contact with skin.



Winston Battery

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S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical attention.

S36 Wear suitable gloves.

S 45 In case of incident, seek medical attention

4 - FIRST AID MEASURES

In case of battery rupture, fume or fire, evacuate personnel from contaminated area and provide maximum ventilation to clean out fumes/gases. Meantime, spray the battery with water or put the smoking battery into basin at once.

In all cases, seek medical attention.

Eye contact: Flush with plenty of water (eyelids held open) for at least 15 minutes.

Skin contact : Remove all contaminated clothing and flush affected areas with plenty of Water and soap for at least 15 minutes Do not apply greases or ointments.

Ingestion: Dilute by giving plenty of water and get immediate medical attention. Assure that the victim does not aspirate vomited material by use of positional drainage. Assure that mucus does not obstruct the airway. Do not give anything by mouth to an unconscious person.

Inhalation: Remove to fresh air and ventilate the contaminated area. Give oxygen or artificial respiration if needed.

5 – FIRE-FIGHTING MEASURES

Fire and fume hazard: Except LFP series batteries, LCP and LMP batteries can leak and/or spout vaporized or decomposed and combustible electrolyte fumes in case of exposure above 150 ° C resulting from inappropriate use, abuse, or from the environment. Possible formation of hydrogen fluoride (HF) and phosphorous oxides during fire. LiPF₆ salt contained in the electrolyte releases hydrogen fluoride (HF) in contact with water.

Extinguishing media: spray the battery with water or put the smoking battery into basin at once.

Can be used : Type D extinguishers , Co₂, Dry chemical or Foam extinguishers

Special hazards : Following cell overheating due to external source or due to improper use, electrolyte leakage or battery container rupture may occur and release inner component/material in the environment.

Eye contact : The electrolyte solution contained in the battery is irritant to ocular tissues.

Skin contact: The electrolyte solution contained in the battery causes skin irritation.

Ingestion: The ingestion of electrolyte solution causes tissue damage to throat and gastro/respiratory tract.

Inhalation : Contents of a leaking or ruptures battery can cause respiratory tract, mucus, membrane irritation and edema.

Special protection: Use self-contained breathing apparatus to avoid breathing irritant fumes.

Wear protective clothing and equipment to prevent body contact with electrolyte solution.

6 - ACCIDENTAL RELEASE MEASURES

The material contained within the batteries would only be expelled under abusive conditions.

Soak under water or spray with copious amounts of water , place in approved container (after cooling if necessary) and dispose in accordance with local regulations.

7 - HANDLING AND STORAGE

The batteries should not be opened, destroyed nor incinerate since they may leak or rupture and release in the environment the ingredients they contain .

Handling: Do not crush, pierce, short (+) and (-) battery terminals with conductive (i.e. metal) goods. Do not directly heat or solder. Do not throw into fire. Do not mix batteries of different types and brands. Do not mix new and used batteries. Keep



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batteries in non-conductive (i.e. plastic) trays.

Storage: Store in a cool (preferably below 30 ° C) and ventilated area away from moisture, sources of heat, open flames, food and drink. Keep adequate clearance between walls and batteries. Temperature above 100 ° C may result in battery leakage and rupture. Since short circuit can cause burn, leakage and battery container rupture hazard, keep batteries in original packaging until use and do not jumble them.

Other: Follow manufacturer recommendations regarding maximum recommended currents and operating temperature range.

Applying pressure or deforming the battery may lead to the rupture of battery container and disassembly followed by eye, skin and throat irritation.

8 - FIRE CONTROLS/PERSONAL PROTECTION

Respiratory protection: Not necessary under normal use. In case of battery rupture, use self- contained full-face respiratory equipment.

Hand protection: Not necessary under normal use. Use Viton rubber gloves if handling a leaking battery.

Eye protection: Not necessary under normal use. Wear safety goggles or glasses with side shields if handling a leaking or ruptured battery.

Skin protection: Not necessary under normal use. Use rubber apron and protective working in case of handling of a ruptured battery.

9 - PHYSICAL AND CHEMICAL PROPERTIES

9.1 Appearance : (Physical shape and color as supplied) Yellow Plastic Prismatic cases with ribs, hermetically sealed and fitted with a metallic terminals/connections.

9.2 Temperature range :

	Continuous	Occasional
In storage during	+ 30 ° C max	-45/+ 85 ° C
discharge during	• 30/+ 80 ° C	-45/+85 ° C
during charge	0/+ 75 ° C	0/+75 ° C

9.3 Specific energy: (Note: Wh = Normal voltage x Rated Ah) kg = Average battery weight)

9.4 Specific pulse power: 600w-1200w/kg Varies depending upon size

9.5 Mechanical resistance : As defined in relevant IEC standard

10 - STABILITY AND REACTIVITY

Conditions to avoid : Heat above 85 ° C or incinerate. Deform, mutilate, crush, pierce, disassemble. Short circuit. Prolonged exposure to humid conditions.

Materials to avoid : N/A



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Hazardous decomposition products: Corrosive/Irritant Hydrogen fluoride (HF) is produced in case of reaction of lithium hexafluorophosphate (LiPF₆) with water. Combustible vapors and formation of Hydrogen fluoride (HF) and phosphorous oxides during fire.

11 - TOXOLOGICAL INFORMATION

Lithium-Ion batteries made by Winston Battery Ltd. do not contain toxic materials.

12 - ECOLOGICAL INFORMATION

When properly used or disposed, Lithium-Ion batteries made by Winston Battery Ltd. can be recycled and do not present environmental hazard during their life time.

13 - DISPOSAL CONSIDERATIONS

Dispose in accordance with applicable regulations, which vary from country to country.

Lithium-Ion batteries should have their terminals insulated and be preferably wrapped in individual plastic bags prior to disposal.

13.1 Incineration :

Incineration should never be performed by battery users but eventually be trained professionals in authorized facilities with proper gas and fumes treatment.

13.2 Recycling : Send to authorized recycling facilities.

14 - TRANSPORT INFORMATION

UN-No. 3480

ARD/RID

Class 9	Packing Group II	ADR/RID-Labels	9
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Proper shipping name	Lithium-ion batteries, UN3480
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IMO

Class	Packing Group II	IMO-Labels	9
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Proper shipping name	Lithium-ion batteries, UN3480
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IATA-DGR

Class	Packing Group II	ICAO-Labels	9
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Proper shipping name	Lithium-ion batteries, UN3480
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Winston Battery Ltd. declares that UN Manual of Tests and Criteria, Part III, sub-section 38.3 is met.

In airfreight, small Lithium-ion batteries (cells<20WH or packs>100WH) are considered as "Expected Lithium-ion Batteries", when they meet the requirements of Ed. 52 of IATA regulations (UN3480) and ICAO Packing Instruction 965 section II, specifying less than 10kg gross per package. Caption shipment can move as normal cargo under current IATA

In other cases (mainly for large cells >20WH or packs > 100WH), they are considered as Class 9 (See Packing Instruction 965 section I for airfreight).

In Seafreight, sealed Lithium-ion batteries are considered as "Lithium-ion Batteries-Not Restricted", when



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they meet the requirements of IMDG of IMO Dangerous Goods Regulations (UN3480).

15 - REGULATION INFORMATION

The transport of rechargeable lithium-ion batteries is regulated by various bodies: IATA, IMO, ADR/RID.

16 – OTHER INFORMATION/DISCLAIMER

This information has been compiled from sources considered to be dependable and is to the best of our knowledge and belief, accurate and reliable as of the date compiled. However, no representation, warranty (either expressed or implied) or guarantee is made to the accuracy, reliability or completeness of the information contained herein.

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